

## Remarks

Claims 6 - 14 and 16 are pending. Favorable reconsideration is respectfully requested.

It should be noted that corresponding foreign applications with claims commensurate in scope with those presently undergoing prosecution have been granted in China and Europe. While Applicants' attorney is aware that dispositions in foreign jurisdictions are not conclusive of patentability in the U.S., they are persuasive of patentability. This is particularly so of European prosecution, where the standards for novelty and non-obviousness (lack of invention) are so similar to U.S. standards.<sup>1</sup>

Claim 15 has been rejected under 35 U.S.C. § 112. Applicants do not acquiesce to this rejection, but have cancelled claim 15 to expedite prosecution.

Claims 6 - 14 and 16 have been rejected over Williams EP 098 5657 ("*Williams*") in view of Zeyss WO 01/90042 ("*Zeyss*") in view of Roscher et al. US 4,818,347 ("*Roscher*") in view of Calcagno et al. US 3,862,216 ("*Calcagno*"), further in view of Broz U.S. 3,904,656 ("*Broz*"). Applicants respectfully traverse this rejection.

The *Williams* reference has been discussed at length, and will not be "rehashed" except where necessary for purposes of discussion.

*Zeyss* is directed to a totally different synthetic method for preparation of vinyl acetate than is *Williams*, and the teachings of *Zeyss* are incompatible with those of *Williams*. For this reason alone, the rejection of the claims under 35 U.S.C. § 103(a) should be withdrawn.

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<sup>1</sup>The largest difference between U.S. and EP standards is the availability of prior art references due to the stricter EP standard of absolute novelty, which is not at issue here with any of the cited references.

The *Zeyss* process begins with the oxidation of ethane, which may be "high purity ethane" containing 90% ethane. The ethane is catalytically oxidized in a first reactor by addition of air (containing 80% nitrogen) and steam. As a result of this process, not only does the ethane oxidation reactor contain an extremely high proportion of inerts, but the product stream does as well. The Examples of *Zeyss* may be consulted to verify this large amount of inerts. In all the examples (Table 1), the amount of steam fed to the reactor is of about the same magnitude or more, in most cases, more, than the ethane feed. Also, the amount of air is regulated such that the nitrogen content by volume (and hence by mols also) is 0.8 times the ethane feed. The conversion of ethane is 7.7 to 18.2% (to all products including byproducts - see page 11, next to last paragraph) and the selectivity to ethane is from 0.7 to 59%. Since the ethane feed is always less than 50 mol percent of the total feed and the maximum disclosed selectivity to ethane is about 60%, the product gas will contain but little ethane on a mol basis.

For example, at the highest ethane conversion, 18.2% (Example II), the feed gas contained 17 volume units (ml/s) of which 6.0 is ethane, a volume (mol) percentage of 35.3% ethane, 6.0 volume parts. At a conversion of 18.2%, this conversion will have consumed 18.2% of the 6.0 parts ethane, leaving 4.9 parts ethane unreacted. Of the 1.1 parts which are converted, 59.0% is converted to ethene, or 0.649 parts. Thus, the ethane feed to the VAM reactor (step b) from the ethane oxidation reactor is about 3.8 mol%! In addition to this feed stream containing only very low amounts of ethene, air (O<sub>2</sub>, inert (5)) is also added, as well as a part of the VAM separation (Step (c)) gas stream (6). This latter gas stream has been further depleted of ethene, by the reaction with acetic acid in step (b), so it contains even less than 3.8 mol % of ethene, even after separating out CO<sub>2</sub>.

Thus, the entire process of *Zeyss* is simply loaded with inerts. The inerts are predominantly ethane and nitrogen, both present in very large quantities, as well as CO, oxygen, other hydrocarbons, etc. This is in direct contrast to *Williams*, who requires an ethylene concentration in his VAM reactor greater than 60 mol percent, and takes every step to minimize inerts. By contrast, *Zeyss* purposefully introduces inerts into the VAM reactor, at a very low ethylene concentration. These processes are diametrically opposed, and one skilled in the art

would not be motivated to combine them. Please refer to the discussion of the standards for the combinability of references set forth on page 10 of the prior response. Because of the conflicting process requirements, these references are not even capable of physical combination. See, *In re Avery*, 186 U.S.P.Q. 161 (CCPA 1975).

It is also respectfully pointed out that it is impermissible to "pick and choose" only those portion of a reference which have been cited to support a rejection without also using all the salient features of the reference. See, e.g., *In re Wesslau*, 147 U.S.P.Q. 391, 393.

The ever present question in cases within the ambit of 35 U.S.C. § 103 is whether the subject matter as a whole would have been obvious to one of ordinary skill in the art following the *teachings* of the prior art at the time the invention was made. It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.

Here, the entire thrust of *Zeyss* is to use ethane as a feedstock for VAM production, necessitating a low conversion rate and thus a low concentration of ethene in the VAM reactor. *Zeyss* apparently overcomes the deficiencies associated with a low ethene content in the VAM reactor by employing a catalyst which is particularly effective in converting ethene and acetic acid to VAM (selectivities 97-98%). However, the salient features of *Zeyss* are incompatible with the features of *Williams*, and thus these references are incombining.

Moreover, although *Zeyss* discloses use of a scrubber, *Zeyss* does not indicate that the scrubber is charged with acetic acid, and there is no reason to conclude that this is so. There are numerous scrubbing liquids which may be used. A rejection must be based on disclosure, teaching, or suggestion, not surmise, and the fact that the reference is silent (with regard to the scrubbing liquid) cannot be construed so as to conclude that acetic acid is the scrubbing liquid. See, e.g., *In re Evanega*, 4 U.S.P.Q. 2d 1249, 1251 (Fed. Cir. 1987):

When evaluating obviousness all claim limitations must be evaluated. "In this respect, the mere absence from the reference of an explicit requirement of the claim cannot reasonably be construed as an affirmative statement that the requirement is in the reference.

This is even more true in the present case due to the great difference between the VAM reactor effluent of the claimed invention, which contains few inerts, and only as much water as is produced as a byproduct, while the reactor (b) of *Zeyss* contains predominantly ethane, very little ethylene, and a very considerable amount of water which is introduced into the oxidation reactor, plus any water generated in the VAM reactor. The vast differences between the reactor effluents prohibits any conclusion that the scrubbing liquids are the same. These are fundamentally different processes.

Finally, there is no indication that the effluents are fed at reactor system pressure to the scrubber, and since the *Zeyss* process involves CO<sub>2</sub> separation prior to the scrubber, there is every reason to believe that the product gas stream is not fed to the scrubber at system pressure. Again, a rejection cannot be based on the lack of a teaching in the reference. *Evanega*, id.

Applicants are not "merely changing the order of performing the process steps" as asserted by the Office. Feeding the product gas to the scrubber at system pressure requires different process conditions than when CO<sub>2</sub> is first removed, decreasing the pressure. Moreover, Applicants' claims require removal of CO<sub>2</sub> from the recycle gas stream, not the product gas stream from the ethane oxidation reactor, as in *Zeyss*.

*Roscher* does not teach scrubbing a product gas stream with acetic acid, which appears to be the interpretation placed on *Roscher* by the Office, and moreover, *Roscher* teaches away from the subject invention. *Roscher* is a now ages-old process where the reactor product stream is passed into a first distillation column, and the gaseous overhead is washed with acetic acid. This is not the product stream, but the first distillation column overhead. This washing step is also not conducted at system pressure, which is indicated by the passage at the top of

column 9, where the gas leaving the washing column is fed to a recycle gas compressor, which would not be necessary if the product gas stream were fed at system pressure to a scrubber.

*Roscher* teaches away from using a scrubber immediately after the VAM reactor, using a distillation train instead. Thus, *Roscher* teaches away from the claimed invention. The combination of *Williams*, *Zeyss*, and *Roscher*, if such combinations of references were proper, would feed the reactor product stream directly to a distillation column, not a scrubber, and since the composition of the distillation column overhead is distinctly different from the composition of the product stream, there is no possibility of combining these features.

*Calcagno* has been discussed previously; it is a completely different process, a liquid phase process, which has not been used commercially for years. This process is totally incompatible with the gas phase processes of Applicants, *Williams*, and the other references. The reaction kinetics are different, the catalyst is different. A portion of the reactor byproduct stream is used to prepare acetic acid, and lower the byproducts in the recycle stream to less than 20 volume percent, an extremely high value. Such a process is incompatible with *Williams*, who desires an extremely low amount of byproducts and inerts. *Calcagno*, for example, indicates that the recycle gas, (which forms by far the largest portion of the reactor inlet gas stream since only approximately 2 molar percent of ethylene is converted to vinyl acetate on each pass (column 3, lines 2-3) is limited to 20 volume percent of oxygen and ethylene, the remaining 80%(!) comprising inert gases (column 2, lines 43-49). This teaching is completely incompatible with *Williams*.

*Broz* adds nothing to the rejection as *Broz* is only related to use of ethylene as a feedstock.

For the reasons expressed above, withdrawal of all rejections of record is respectfully solicited.

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Applicants submit that the claims are now in condition for Allowance, and respectfully request a Notice to that effect. If the Examiner believes that further discussion will advance the prosecution of the Application, the Examiner is highly encouraged to telephone Applicants' attorney at the number given below.

Please charge any fees or credit any overpayments as a result of the filing of this paper to our Deposit Account No. 02-3978.

Respectfully submitted,

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